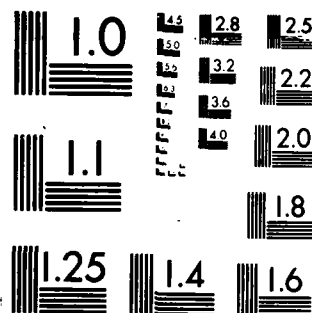


AD-A155 036 ACQUISITION OF NAVY LAND-BASED TEST SITES CAN BE BETTER 1/A
MANAGED(U) GENERAL ACCOUNTING OFFICE WASHINGTON DC
NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIV
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BY THE U.S. GENERAL ACCOUNTING OFFICE
Report To The Secretary Of The Navy

AD-A155 036

**Acquisition Of Navy Land-Based Test
Sites Can Be Better Managed**

This report discusses ways that the Navy can improve the acquisition management of land-based test sites to ensure that maximum use is made of existing facilities, duplication between existing and new sites is prevented, and the establishment of new sites is cost-effective.

GAO makes several recommendations designed to improve the acquisition management of land-based test sites. The Department of Defense generally agreed with GAO's findings and recommendations and outlined actions planned to implement these recommendations.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-217964

The Honorable John F. Lehman
The Secretary of the Navy

Dear Mr. Secretary:

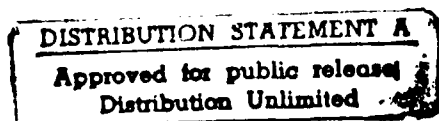
Improvements are needed in the acquisition management of land-based test sites to ensure that maximum use is made of existing facilities, duplication between existing and new sites is prevented, and the establishment of new sites is cost-effective.

The Navy has numerous physical resources for providing research, development, test, evaluation, training, and operational support for weapons systems and is acquiring more. Land-based test sites are part of these resources. They are acquired to perform a broad range of tasks including test and evaluation, integration of components, training, and operational support. The Navy does not have data on the total number or the value of these sites. However, for those land-based test sites having cost data available, facilities and equipment ranged in value from \$5 million to over \$400 million a site.

The acquisition of land-based test sites is governed by Naval Material Command Instruction 3960.8. This instruction requires that maximum use be made of existing resources before establishing new test sites. To support this requirement, the instruction further requires that (1) systems commands (e.g., air, sea, electronic) maintain inventories of existing facilities and (2) program managers cite their rationales for site selection in program planning documents.

Land-based test sites can perform many services in the weapons development and acquisition process, but the Navy often does not adequately demonstrate the need for new facilities prior to purchase. We found:

--Some Navy officials were not aware of the Naval Material Command instruction and others did not



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think the instruction applied to their programs. As a result, the instruction requirements for justifying, reviewing, and approving the acquisition of new land-based test sites were not being followed.

- Neither the Navy nor the systems commands maintained complete and up-to-date inventories of available test sites. Without complete inventories, new sites may be established that duplicate existing facilities because requesting and reviewing officials are not aware of them.
- Most of the acquisition programs had no documentation to show how the need for a site was identified, whether alternatives were considered, and why the particular alternative was chosen.
- The Naval Material Command instruction does not make cost-effectiveness a requisite for establishing a new land-based test site. Chief of Naval Operations and Naval Material Command officials said they rely on the integrity and knowledge of the program manager to properly evaluate the need for the site and they do not require that the manager demonstrate cost-effectiveness before approving the site.
- The site review and approval process does not assure that a proposed site is needed. The lack of site inventories and other evaluation techniques places too much reliance on the personal knowledge of the reviewers.

Therefore, the Navy does not have as much assurance as it could that the new sites it purchases are the most cost-effective alternatives and that they do not duplicate existing facilities. For example, the Naval Sea Systems Command permitted the Aegis program office to establish a contractor land-based test site to integrate and test a revised antisubmarine warfare combat system for the Aegis cruiser and DDG-51 destroyer. The Naval Material Command's Naval Ocean Systems Center had integrated and tested earlier versions of the combat system, had the Navy expertise and facilities to do the same functions for the revised system, and believed it could integrate and test the revised system at less cost than the new site could. Any doubt as to whether establishment of the new site was in the best interest of the Navy could have been resolved had decisionmakers considered all pertinent data and made appropriate cost-benefit analyses.

Navy officials agreed that problems exist and have begun to make changes in regulations and recordkeeping activities, but actions are not yet complete. While these actions are steps in

the right direction, we believe more can be done. Therefore, we recommend you direct that:

- The Naval Material Command instruction clearly state (1) which programs and sites are subject to its requirements and (2) that the sites selected be evaluated on the basis of cost-effectiveness and needed capability.
- The Chief of Naval Operations or the Naval Material Command instruction be revised so that the instructions agree on the responsibility for identifying the need for land-based test sites. Currently, the Naval Material Command instruction assigns this responsibility to the program manager whereas the Naval Operations instruction makes the Chief responsible.
- The Naval Material Command requirement that systems commands maintain complete and up-to-date inventories of in-house and contractor test sites be enforced to aid in making acquisition decisions, and the Chief of Naval Operations establish a central Navy-wide inventory of test and evaluation facilities.
- Program managers consider alternatives in selecting sites and include their rationale in the planning documents.
- The Chief of Naval Operations and Naval Material Command program review and approval process include evaluation techniques that consider the cost-effectiveness of sites selected, the availability of existing facilities, and the extent of duplication between existing and proposed sites.

In providing official written comments on a draft of this report, the Department of Defense generally agreed with our findings and recommendations. Our findings, recommendations, and agency comments are discussed in more detail in appendix I. The Department's written comments are included as appendix II.

As you know, 31 U.S.C. §720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

B-217964

We are sending copies of this report to the Chairmen of the above committees; the Chairmen, Senate and House Committees on Armed Services; the Secretary of Defense; and the Director, Office of Management and Budget.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Director

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ACQUISITION OF NAVY LAND-BASEDTEST SITES CAN BE BETTER MANAGED

The Navy operates a variety of facilities with the capabilities to do research, development, and testing for weapons systems and their components and is acquiring more. These facilities range from small research and development laboratories to operational test ranges encompassing thousands of square miles. The facilities have highly sophisticated computers and other equipment to evaluate every phase of a weapons system from basic research to actual wartime scenarios. As weapons systems have become more complex, the need for test and evaluation has increased.

In the mid-1960s, the Navy adopted land-based testing to reduce development, construction, and repair problems. This testing was expanded in the early 1970s to help ensure new weapons systems and their components were viable before acquisition and installation. Land-based test sites are facilities, owned either by the Navy or by its contractors, that test, refine, and integrate weapons systems being purchased or undergoing changes. The sites are usually dedicated to a specific weapon system, such as a ship, aircraft, or missile, or to one of its major subsystems, such as the combat subsystem or the propulsion subsystem.

Systems that have been tested and shown to work before being purchased or altered are less likely to cause installation and operational problems. Navy officials cited the following benefits as resulting from land-based test sites.

- Reduction in the amount of defective materials provided by the government to contractors, with a consequent reduction in the number of contractor claims.
- Shorter construction periods.
- Reduction in time between government acceptance of a major system and achievement of fully operational, deployable status.
- Development of internal Navy expertise for identifying and evaluating system or equipment problems, changes, and contractor proposals.
- Timely, effective life-cycle support that eliminates the need to remove an active system from duty in order to evaluate a problem.

Organizationally, the weapon system program manager is responsible for identifying the need for a land-based test site. The responsibility for reviewing and approving a site extends upward through the Navy organizational structure, from the systems command--Naval Air Systems Command (NAVAIR), Naval Sea Systems Command (NAVSEA), or Naval Electronic Systems Command (NAVELEX)--to the Naval Material Command (NAVMAT) and to the Office of the Chief of Naval Operations (CNO).

In the two decades since the Navy located its first site at the Philadelphia Naval Shipyard, the number of sites and functions have increased, but the Navy was unable to tell us the total number of sites it and contractors currently have or are acquiring. Today, NAVAIR, NAVSEA, and NAVELEX have land-based test sites. Of the 12 Navy and contractor land-based test sites we reviewed, facility and equipment costs ranged from an estimated \$5 million for a HARM missile software support activity to over \$400 million for an Aegis cruiser combat systems engineering development site.

The NAVMAT instruction (3960.8) governing land-based test sites permits a broad range of functions to be performed, including:

- Developmental or operational test and evaluation.
- Integration and interface testing of equipment and subsystems.
- Verification of subsystem equipment.
- Development or verification of technical documentation and production acceptance test procedures.
- Verification and validation of operational and maintenance computer software.
- Initial operational or maintenance training.
- Proof testing alterations or modifications.
- Verification of operator and crew task assignments.
- Verification of installation and check-out procedures.
- Preinstallation testing and check-out of production hardware.

A recent draft revision of the instruction also designates computer software support activities as land-based test sites.

Most of these functions are also performed by other Navy facilities owned by the systems commands and NAVMAT. However, the Navy does not consider these other sites to be land-based test sites. Land-based test sites generally support individual weapon acquisition programs and are designed to satisfy specific program needs. The other sites perform similar functions but tend to be more general purpose or functionally oriented than land-based test sites.

OBJECTIVE, SCOPE,
AND METHODOLOGY

Given the significant investment represented by land-based test sites and their growing numbers in the Navy, our review sought to determine how well the Navy ensures that acquisition of new sites is cost-effective and does not duplicate existing facilities. In pursuing this objective, we examined (1) the controls for justifying and establishing sites and (2) the adequacy of the review and approval process.

We traced the acquisition and use of land-based test sites and identified facilities doing similar functions through examination of Navy documents and discussions with Navy officials. For 10 of the 12 land-based test sites included in our review, we followed the process from the initial identification of need for the sites through installation and use of weapon systems that had been tested at the sites. We attended briefings, toured facilities, and analyzed documents. Also, we interviewed

- program managers and staff from NAVAIR, NAVSEA, and NAVLEX;
- reviewing officials from NAVMAT and CNO;
- Navy and contractor officials at land-based test sites;
- Navy and contractor officials responsible for installing and testing weapons systems; and
- Navy officials responsible for monitoring and providing in-service support to the fleet.

Two limitations affected the scope of this review. First, we were unable to evaluate the cost-effectiveness of the land-based test sites. The Navy does not maintain quantifiable data on test site efficiency, effectiveness, or economy, and we could not obtain reliable data with which to make an independent evaluation. Second, for most of the sites, we could not determine whether program requirements had been compared with available Navy test site resources before new sites were acquired or if the best alternative was selected. Program managers usually did not maintain documentation which would provide answers to these questions.

We performed our review from January 1984 to December 1984 at the following locations:

Headquarters Commands

Office of the Chief of Naval Operations, Washington, D.C.
Naval Material Command, Washington, D.C.
Naval Air Systems Command, Washington, D.C.
Naval Electronic Systems Command, Washington, D.C.
Naval Sea Systems Command, Washington, D.C.
Operational Test and Evaluation Force, Norfolk, Virginia
Inspection and Survey Board, Washington, D.C.

Naval Laboratories, Test Facilities, Ranges

Naval Weapons Center, China Lake, California
Pacific Missile Test Center, Point Mugu, California
Naval Ocean Systems Center, San Diego, California
Naval Underwater Systems Center, New London, Connecticut

Land-Based Test Sites

Aegis Combat Systems Engineering Design Site, Moorestown,
New Jersey
Aegis RCA Production Test Center, Moorestown, New Jersey
FFG-7 Combat Systems Test Center, Ronkonkama, New York
Integrated Combat Systems Test Facility, San Diego,
California
Electronic Warfare Systems Support Laboratory, Pacific
Missile Test Center, Point Mugu, California
F-14 Software Support Activity, Pacific Missile Test Center,
Point Mugu, California
F/A-18 Weapons System Support Activity, Naval Weapons
Center, China Lake, California
HARM Missile Software Support Activity, Naval Weapons
Center, China Lake, California
Naval Electronic Systems Command FFG-7 Test Site,
Charleston, South Carolina
DD-963 and LHA-5 Combat System Test Facility, Ingalls
Shipyard, Pascagoula, Mississippi
U.S.S. Norton Sound, Port Hueneme, California

Other Navy Sites/Facilities

Naval Ship Weapons System Engineering Station, Port Hueneme,
California
Harpoon Missile Laboratory, Naval Weapons Center, China
Lake, California
Harpoon Engineering Support Office, Pacific Missile Test
Center, Point Mugu, California
Production Acceptance Test and Evaluation Facility, Pacific
Missile Test Center, Point Mugu, California

Range Control Center, Naval Weapons Center, China Lake,
California
Range Operations Center, Pacific Missile Test Center, Point
Mugu, California

We also contacted the program office and reviewed documentation for the LAMPS Mark III helicopter program's land-based test site, but we did not visit the actual test site in New York.

Our review was made in accordance with generally accepted government audit standards.

NAVMAT INSTRUCTION
NOT ALWAYS FOLLOWED

NAVMAT Instruction 3960.8 allows a wide range of functions to be performed by land-based test sites. The same types of functions are performed by numerous other Navy activities but they are not classified as land-based test sites. Therefore, Navy officials are confused as to the applicability of this instruction to their programs. Some Navy officials were not aware of the NAVMAT instruction. Others did not think the instruction applied to their programs. As a result, the instruction requirements for justifying, reviewing, and approving the acquisition of new land-based test sites were not followed.

This problem is illustrated at the China Lake Naval Weapons Center. It has a number of sites that provide the type of support authorized for land-based test sites. The Center also supports programs in the acquisition categories listed in the instruction. However, Center officials said they were not aware of the instruction prior to our review and questioned whether it actually applied to their sites. They also said they planned to determine its applicability to their programs for future actions.

NAVAIR and NAVSEA officials did not believe that the instruction was applicable to some of their sites. NAVAIR officials did not regard computer software support activities as land-based test sites, although most headquarters and program officials interviewed agreed the sites support programs and perform functions described in the NAVMAT instruction. NAVSEA officials thought parts of the instruction were no longer valid because of changes made in August 1983 to an Operations Navy (OPNAV) instruction referenced by the NAVMAT instruction. This instruction (OPNAV Instruction 3960.10B) designates the Chief of Naval Operations as the person responsible for determining the need for land-based test sites for ship acquisition programs whereas the NAVMAT instruction assigns the responsibility to the program manager.

NAVMAT officials stated that they would revise NAVMAT Instruction 3960.8 to better define the sites subject to the instruction. Software support activities will be addressed as one of the possible functions of a land-based test site. CNO officials stated that the change to the OPNAV instruction was not intended to relieve program managers of the responsibility for determining the need for land-based test sites but rather to ensure the program managers understand that the sites must be approved by CNO. CNO officials also stated that they would revise OPNAV Instruction 3960.10B to make it clear that program managers are responsible for identifying the need for land-based test sites.

COMPLETE INVENTORIES OF EXISTING SITES NOT MAINTAINED

Neither the Navy nor the systems commands maintained a central or a complete systems command inventory of available test sites. Without complete inventories, new sites may be established that duplicate existing facilities because requesting and reviewing officials may not be aware of them.

According to the NAVMAT instruction, before a new test site is acquired, officials must compare their needs to the assets and capabilities of existing test sites. This comparison should ensure both the maximum utilization of existing sites and the timely, cost-effective acquisition and development of new ones. The instruction assigns the responsibility for making this comparison to the program manager.

The instruction also directs each Navy systems command to establish a focal point to provide information on sites and their capabilities. The focal point is to maintain a site inventory for the systems command and to coordinate site availability reviews among the commands. However, the instruction does not require the focal points or any other office to maintain a central inventory of all available Navy test sites and their capabilities.

The systems commands maintained only partial or no inventories of test sites. NAVAIR had a central inventory of software support activities, but it did not include other NAVAIR land-based test sites. NAVSEA had a partial listing of contractor sites and a more complete list of internal Navy sites. NAVLEX had no inventory. Without complete inventories, the Navy may establish new sites that duplicate existing facilities. Also, a complete facility might be purchased when a less expensive modification to an existing facility could have been made.

As an example of possible overlap or duplication, both NAVMAT's China Lake Naval Weapons Center and NAVAIR's Pacific Missile Test Center provide test support to the Harpoon missile program. In addition, NAVSEA's Naval Ship Weapons System Engineering Station recently completed a new laboratory that also provides engineering test services for the Harpoon. All three sites are within a 200-mile radius, yet there is no single inventory that shows the three sites and distinguishes among the services provided by each. Officials at the first two sites did not know of the new laboratory's existence.

CNO officials told us that their Test and Evaluation Division would prepare a central inventory of test sites for the Navy. NAVSEA officials stated that they were developing a better inventory of land-based test sites, as well as sea-based, for their command.

In commenting on our draft report, the Department of Defense (DOD) agreed that a central inventory had merit and stated that one would be developed. DOD stated, however, that a land-based test site of one command would be of little use to another command. Although this statement may be generally correct, we believe that in some cases a test site could have cross-command applicability. For example, the LAMPS Mark III land-based test site is a joint NAVAIR/NAVSEA site.

DOD further stated that the three test sites in the Harpoon example are described in NAVSEA's test and range facilities catalog. We reviewed the catalog and found that the facilities were described in general terms, but the test support provided the Harpoon program was mentioned for only one of the sites.

SITE SELECTION RATIONALE SELDOM DOCUMENTED

Most of the acquisition programs we reviewed had no documentation to show how the need for a site was identified, other alternatives were considered, and why the particular alternative was chosen. Because CNO and NAVMAT reviewers rely on the program manager to properly evaluate the need for a land-based test site and the available alternatives, we reviewed the manager's decisionmaking process.

Acquisition program officials stated that they base their site research, cost comparisons, and other analyses upon the personal knowledge or expertise of their staffs. In the absence of a complete list of available Navy facilities, they depend upon their staff members' personal knowledge to ensure that test sites do not overlap or duplicate other Navy activities or sites.

RECOMMENDATIONS

- RECOMMENDATION 1: GAO recommended the Secretary of the Navy direct that the NAVMAT instruction clearly state (1) which programs and sites are subject to its requirements and (2) that the sites selected be evaluated on the basis of cost-effectiveness and needed capability. [See pp. 3 and 15.]

DOD Response. Concur. NAVMAT Instruction 3960.8 will be revised by 15 August 1985. Cost-effectiveness will be addressed as stated in our response to "Finding F."

- RECOMMENDATION 2: GAO recommended the Secretary of the Navy direct that the OPNAV or NAVMAT instructions be revised so that they agree on the responsibilities for identifying the need for land-based test sites. [See pp. 3 and 15.]

DOD Response. Concur. OPNAV Instruction 3960.10B and NAVMAT Instruction 3960.8 will be revised by 15 August 1985.

- RECOMMENDATION 3: GAO recommended the Secretary of the Navy direct that the NAVMAT requirement that Systems Commands maintain complete and up-to-date inventories of in-house and contractor test sites be enforced to aid in making acquisition decisions; and that the Chief of Naval Operations establish a central Navy-wide inventory of test and evaluation facilities. [See pp. 3 and 15.]

DOD Response. Concur. NAVMAT Instruction 3960.8 will be revised by 15 August 1985. NAVMAT will establish a central inventory for CNO by 15 December 1985.

- RECOMMENDATION 4: GAO recommended the Secretary of the Navy direct that program managers consider alternatives in selecting sites and include their rationales in the planning documents. [See pp. 3 and 15.]

DOD Response. Concur. NAVMAT Instruction 3960.8 will be revised by 15 August 1985.

- RECOMMENDATION 5: GAO recommended the Secretary of the Navy direct that the Chief of Naval Operations and NAVMAT program review and approval process include evaluation techniques which consider the cost-effectiveness of the site selected, the availability of existing facilities, and the extent of duplication between existing and proposed sites. [See pp. 3 and 15.]

DOD Response. Concur. NAVMAT Instruction 3960.8 will be revised by 15 August 1985 to clarify and provide guidance on the elements of the review and approval process.

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Site (ASEDS). The ASWPTS and ASEDS were established to support the installation and testing of the Surface Ship ASW Combat Systems being installed aboard DDG 51 and CG 47 Class ships. These sites do not duplicate any existing land-based sites, including those identified on page 9 of the report. In addition, the functions being performed at these two sites are significantly different than those being performed at any Navy activity, including NOSC. Specifically, the ASWPTS was established to test, in an integrated fashion, production ASW subsystems as an ASW combat system, conduct an end-to-end test from the sensors through the fire control, and to serve as a staging area for the shipment of the fully tested and integrated ASW Combat System to the shipyard for installation in AEGIS cruisers and destroyers. The purpose of ASEDS is to develop and test engineering changes for the ASW Combat System being installed aboard DDG 51 class of AEGIS destroyers. It consists of in-house and configuration control model equipment, most of which was previously located at Syracuse, interconnected to form an ASW Combat System similar to that being installed aboard DDG 51. Costs associated with these two sites are significantly less than the \$50 million identified. Costs associated with establishment of the ASWPTS and the ASEDS combined are less than \$15.0 million. The decision to use the Syracuse sites resulted from an extensive study conducted by NAVSEA in 1982. Sites considered included NOSC as well as many others. The Syracuse site was determined to be the only one where the required activities could be accomplished in a cost effective and timely manner. OPNAV did approve it. Site selection documentation is and has been available in NAVSEA.

establish the new \$50 million site. In addition, since AEGIS officials did not consider this a land-based site, it did not follow the NAVMAT instruction.

GAO concluded that the land-based test site process should include an evaluation of cost-effectiveness. [See pp. 2, 12, 13, and 14.]

DOD Response. Partially concur. DOD disagrees that NAVMATINST 3960.8 does not make cost effectiveness a requisite for establishing a LBTS. The following excerpts from that instruction pertain:

- a. "Fundamental to the selection site location is the need to obtain maximum benefit to the Navy for resources invested."
- b. An objective of the instruction is "... to ensure the comparison of all projects planned LBTS requirements vs. inventory and assets, thereby ensuring the maximum utilization of existing and/or timely and cost effective development/acquisition of a new LBTS."
- c. Two factors that bear on decisions to establish a LBTS are (1) "maximum use of existing facilities ... should be pursued when ... cost benefits favorably indicate this as a rational approach" and (2) "an examination of the elements of life cycle costs relative to alternative site locations ... must be made."

DOD agrees that cost effectiveness should be more formally addressed in our documentation. However, the specific technical problems cannot be foreseen in a given program and the cost of correcting them at a LBTS compared to the costs of correcting them later cannot be meaningfully estimated.

The Department also believes that the example used to support Finding F is unclear and possibly inaccurate. It is not clear which test site is being discussed on page 15 of the report. If the test site referred to is one of the two test sites at General Electric in Syracuse, New York, the report is inaccurate. These are: (1) ASW Production Test Site (ASWPTS); and (2) ASW System Engineering Development

how the need for the site was identified, whether alternatives were considered, and why the particular alternative was chosen. GAO reported that, according to the Navy, program acquisition officials base their site research, cost comparisons, and other analyses upon the personal knowledge or expertise of their staffs. GAO concluded that (instead of the required documentation) the land-based test site acquisition is based primarily on the personal knowledge of the reviewers. (GAO noted NAVMAT advised that in the future, better documentation for proposed sites would be required.) [See pp. 1, 2, 11, 12, and 14.]

DOD Response. Partially concur. The DOD disagrees that LBTS did not have programming documentation that supports the site selection process. All LBTS had such approval documentation in order to obtain the required funding but it was not retained. DOD agrees that it would be useful to retain records to document how the need for a particular site was identified, what alternatives were considered, and why the final alternative was chosen. However, the draft GAO report states that according to the Navy, program managers base their site research, cost comparisons, and other analyses on the personal knowledge or expertise of their staff. The GAO description of this process did not acknowledge the data that does exist from past programs and is used, such as site management plans and test program reports. Nor does it recognize the staff offices located in the Systems Commands which oversee the various test and range facilities and act as liaisons with them.

FINDING F: Cost Effectiveness Not Required By NAVMAT Instruction. GAO found that NAVMAT Instruction 3960.8 does not make cost-effectiveness a requisite for establishing a new land-based test site. GAO further found that the CNO and NAVMAT do not require the program manager to demonstrate cost-effectiveness before approving a site.

-- Example: GAO cited the Navy's decision to establish a contractor site to integrate and test a revised anti-submarine warfare combat system for the DDG-51 destroyer and AEGIS cruiser. GAO identified NAVMAT's Naval Ocean Systems Center which could possibly have performed the necessary program support because it already was integrating and testing other versions of this combat system. The AEGIS Program Manager chose to contract on a sole-source procurement basis because the Government did not have the capability to perform the work in-house. The Center was not contacted prior to the decision to

officials must compare their needs to the assets and capabilities of existing sites. The instruction requires each Systems Command to maintain a site inventory and coordinate site availability reviews among commands. (It does not, however, require that a central inventory of all available sites be maintained, and their capabilities.) GAO found that the Systems Commands do not maintain an up-to-date inventory of available test sites, nor does the Navy maintain a central inventory.

-- Example: GAO cited the Harpoon missile program as an area where possible overlap or duplication has occurred. Both NAVMAT's China Lake Naval Weapons Center and NAVAIR's Missile Test Center provide test support to the Harpoon missile program. In addition, NAVSEA's Naval Ship Weapons System Engineering Station recently completed a new laboratory which also provides engineering test services for the Harpoon. All three sites are within a 200-mile radius, yet there is no single inventory which shows the three sites and distinguishes among the services provided by each. (GAO reported that officials at the first two sites did not know the new laboratory existed.) GAO concluded that without complete inventories, the required comparison cannot be done, and therefore, the Navy may establish new sites that overlap or duplicate existing facilities. GAO also concluded that a complete facility might be purchased when a less expensive modification could have been made to an existing facility. (GAO noted that the Navy advised its Test and Evaluation Division would prepare a central inventory of test sites.) [See pp. 2, 10, 11, and 14.]

DOD Response. Concur. However, none of the sites addressed in the GAO example are LBTS. Nevertheless, the three general purpose test sites are described in NAVSEA's "Test and Range Facilities Catalog". Since each LBTS is unique to a weapon system, overlap or duplication is very unlikely. The Navy has only about twenty-two LBTS. LBTS of NAVSEA would be of little use to NAVELEX or NAVAIR and vice versa. Notwithstanding this, DOD agrees a central inventory has merit and it will be developed.

- FINDING E: Site Selection Rationale Seldom Documented. GAO reported that the NAVMAT instruction requires the program managers to cite their rationales for site selection in programming documents. GAO found, however, that most of the acquisition programs it reviewed had no documentation to show

- Example 2: NAVAIR officials did not believe the instruction applied to some of their sites and did not regard computer software support activities as land-based test sites, although some agreed the sites supported functions illustrated in the NAVMAT instruction.
- Example 3: NAVSEA did not believe the NAVMAT instruction was valid because of changes made in August 1983 to OPNAV Instruction 3960.10B, designating the Chief of Naval Operations as the responsible entity for determining the need for land-based ship acquisition test sites. GAO concluded that because the same types of functions are performed by numerous other activities which are not classified as land-based test sites, some Navy officials are confused as to the applicability of the NAVMAT instruction to their facilities. In addition, GAO concluded some Navy officials are simply not aware of the NAVMAT instruction. GAO finally concluded that management of the Navy's land-based test site acquisition process is not working as effectively as it could. (GAO noted that NAVMAT officials had stated the instruction would be revised (1) to better define the sites subject to the instruction and (2) to include software support activities. GAO also reported Navy officials stated the OPNAV Instruction 3960.10B would be revised to make it consistent with NAVMAT instruction--i.e., that program managers are responsible for determining the need for land-based test site and the CNO is responsible for approving the acquisition.) [See pp. 1, 2, 9 and 10.]

DOD Response. Concur. DOD agrees that confusion exists in the definition of LBTS as contained in NAVMATINST 3960.8. The secondary objectives would not warrant a LBTS without the facility serving its primary function. For example, NAVSEA officials thought that parts of NAVMATINST rather than the entire instruction were no longer valid because of changes made by OPNAV in August 1983. In revising NAVMAT Instruction 3960.8 to include software support activities as LBTS, the instruction will address these activities as one of the possible functions of a LBTS.

- FINDING D: Complete Inventories Of Existing Navy Land-Based Test Sites Not Maintained. GAO reported that according to the NAVMAT instruction, before a new test site is acquired,

- Integration and interface testing of equipment and subsystems;
- Verification of subsystem equipment;
- Development or verification of technical documentation and production acceptance test procedures;
- Verification and validation of operational and maintenance computer software;
- Initial operational or maintenance training;
- Proof testing alterations or modifications;
- Verifying operator and crew task assignments;
- Verifying installation and checkout procedures; and
- Preinstallation testing and checkout of production hardware.

GAO noted that most of these functions are also performed by other facilities owned by the Systems Commands and NAVMAT. GAO found, however, that the Navy does not consider these other sites to be land-based test sites because they tend to be more general purpose or functionally oriented, rather than dedicated to a specific weapon system. [See pp. 6 and 7.]

DOD Response. Concur. It must be noted that there is a distinction between LBTS and "general purpose facilities". The definition in "Finding A" above for a LBTS is correct. LBTSs may and should be assigned secondary functions if they are to be cost effective. This distinction in the definition of LBTS in NAVMATINST 3960.8 is not clear as written.

- FINDING C: NAVMAT Instruction Not Always Followed. GAO found that the NAVMAT instruction requirements for justifying, reviewing, and approving the acquisition of new land-based test sites are not being followed. GAO reported that there is confusion among Navy officials as to the applicability of the NAVMAT instruction to their programs, while others were not even aware of the instruction.
- Example 1: The NAVMAT China Lake Naval Weapons Center has a number of sites that provide the type of support authorized by NAVMAT Instruction 3960.8 for land-based test sites, but China Lake officials were not aware of the instruction and questioned whether it actually applied to the sites they controlled.

GAO DRAFT REPORT - DATED FEBRUARY 21, 1985

(GAO CODE No. 943585) OSD CASE No. 6698

"ACQUISITION OF NAVY LAND-BASED TEST SITES CAN BE BETTER MANAGED"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

- **FINDING A: Navy Policy To Use Land-Based Test Sites.** GAO found that in the mid-1960s the Navy adopted land-based testing to reduce development, construction, and repair problems. In the early 1970s, this testing was expanded to help ensure new weapons systems and their components were viable before acquisition and installation. (Land-based test sites (LBTS) are facilities, owned either by the Navy or its contractor, which test, refine, and integrate weapon systems being purchased or undergoing changes and are usually dedicated to a specific weapon system.) GAO further found that as weapon systems have become more complex, the need for land based test sites to support the acquisition of these systems has increased. According to the Navy, benefits resulting from land-based test sites are (1) reduction in the amount of defective contractor material, (2) shorter construction periods, (3) shorter time to reach deployable status, (4) development of internal Navy expertise, and (5) timely, effective life cycle support. GAO concluded these land-based test sites have the potential to provide considerable benefits. [See pp.5, 6, 14, and 15.]

DOD Response. Concur.

- **FINDING B: Responsibility For Navy Land-Based Test Sites.** GAO found that organizationally, the weapons system manager is responsible for identifying the need for land-based test sites, with the review and approval process extending up through the System Commands, to the Naval Material Command (NAVMAT) and then to the Office of the Chief of Naval Operations (CNO). GAO further found that NAVMAT is responsible for policy and guidance. GAO reported that the NAVMAT Instruction 3960.8 governing land-based test sites permits a broad range of functions, as follows:

-- Developmental or operational test and evaluation;

Enclosure (1)



MANPOWER,
INSTALLATIONS
AND LOGISTICS

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D C 20301-4000

4 APR 1985

Mr. Frank C. Conahan
Director, National Security and
International Affairs Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

This is in response to your letter of February 21, 1985 concerning the draft report entitled, Acquisition of Navy Land-Based Test Sites Can Be Better Managed (GAO Code No. 943585, OSD Case No. 6698).

The Department of Defense generally concurs with the draft report's findings and recommendations. There are, however, several factual inaccuracies in the report which were brought to the attention of your staff during a meeting on March 22, 1985. Detailed comments are set forth in the enclosure hereto.

The opportunity to comment on this report in draft form is appreciated.

Sincerely,

Larry L. Calhoun
ACTG Assistant Secretary of Defense
(Manpower, Installations & Logistics)

Enclosure

GAO note: Page references have been changed to correspond to pages in the final report.

- The NAVMAT requirement that systems commands maintain complete and up-to-date inventories of in-house and contractor test sites be enforced to aid in making acquisition decisions, and the Chief of Naval Operations establish a central Navy-wide inventory of test and evaluation facilities.
- Program managers consider alternatives in selecting sites and include their rationale in the planning documents.
- The Chief of Naval Operations and NAVMAT program review and approval process include evaluation techniques that consider the cost-effectiveness of sites selected, the availability of existing facilities, and the extent of duplication between existing and proposed sites.

AGENCY COMMENTS

On April 4, 1985, DOD provided official written comments on a draft of this report. (See app. II.) DOD agreed with each of our recommendations and outlined actions and milestones for improving the acquisition management of land-based test sites. DOD stated that NAVMAT Instruction 3960.8 and OPNAV Instruction 3960.10B would be revised by August 15, 1985. In addition, NAVMAT will establish a central inventory of land-based test sites by December 15, 1985.

Although generally agreeing with our findings, DOD questioned some of the details of our presentation. These matters are discussed, where appropriate, in the individual finding sections of the report.

This can lead to situations where existing facilities are underutilized and sites overlap or duplicate each other. For example, in 1976 NAVSEA established the Integrated Combat Systems Test Facility, at a cost of over \$33 million, to provide software support for combat systems of surface ships. However, all surface ship program managers have not been using the facility as anticipated when it was established. NAVSEA's Aegis program is building its own facilities for software support and the deputy commander for combat systems is seeking an alternative location for operational support for the FFG-7 program.

In another case, NAVSEA recently built a \$7 million guided missile laboratory at the Naval Ship Weapons System Engineering Station, Port Hueneme, California. This laboratory, while not classified as a land-based test site by NAVSEA, performs similar functions. The laboratory was under construction before CNO's Test and Evaluation Division was aware of its existence, even though this division is responsible for approving all Navy test and evaluation facilities. One of the primary justifications for the laboratory was the support of NAVSEA's Aegis shipbuilding program. However, Aegis program officials were unaware that this facility was intended to support their program. The program manager had selected a site and begun construction of a similar laboratory at Wallops Island, Virginia.

CONCLUSIONS AND RECOMMENDATIONS

The Navy is increasing the use of land-based test sites to support the acquisition of major weapons systems. These sites have the potential to provide considerable benefits because they can perform many functions, but the management of their acquisition is not working as effectively as it could. Navy instructions and procedures are not ensuring that sites purchased are cost-effective and do not duplicate other Navy facilities.

Navy officials agreed that problems exist and have begun to make changes in regulations and recordkeeping activities but actions are not yet complete. While these actions are steps in the right direction, we believe more can be done. Therefore, we recommend the Secretary of the Navy direct that:

- The NAVMAT instruction clearly state (1) which programs and sites are subject to its requirements and (2) that the sites selected be evaluated on the basis of cost-effectiveness and needed capability.
- The OPNAV or the NAVMAT instruction be revised so that the instructions agree on the responsibility for identifying the need for land-based test sites.

We included this example because officials of the Naval Ocean Systems Center, as well as the Naval Underwater Systems Center, told us that the system being tested was an upgrade of a prior system--not a totally new or different system--and that both Centers had the expertise to work on the revised system since they had worked on prior versions of the same system. Based on these discussions and documentation provided by NAVSEA and other organizations, we do not believe that adequate consideration was given to existing sites and available Navy expertise. In this regard, we asked DOD officials to provide us the report resulting from the 1982 NAVSEA study and were told that no formal study report had been prepared.

As for the approval of the contractor site, the approval was made without a review by either NAVMAT or CNO test site reviewing officials. These officials said they were not aware of the plan to establish the contractor site until we told them. With regard to cost, both the \$50 million figure cited by us and the \$15 million figure cited by DOD were based on Navy estimates. We did not audit these estimates. Our point is that either amount was large enough to warrant cost-benefit analyses of possible alternatives.

CNO AND NAVMAT REVIEW PROCESS COULD BE IMPROVED

The CNO and NAVMAT review and approval process does not assure maximum use of existing facilities, prevention of overlap and duplication among sites, or cost-effectiveness of the site selected. The lack of site inventories and other evaluation techniques places too much reliance on the personal knowledge of the reviewers.

The NAVMAT review and approval process for land-based test sites is based primarily on the personal knowledge of the reviewer. He reviews the proposed use of the facility to determine if it will do the functions planned by the program manager and is not duplicative of existing facilities. NAVMAT officials stated that a proposal usually will be approved if it seems logical. They also said NAVMAT relies on the personal knowledge and integrity of the program manager to have considered all alternatives and to not request a site that is not needed.

According to CNO officials, their Test and Evaluation Division reviews a proposal in a similar manner. However, CNO relies upon NAVMAT's review and validation of need as well as the integrity and knowledge of the program manager. Officials of both offices said they did not have the staff expertise available to make a detailed evaluation of the program manager's plan. They look for glaring inconsistencies or illogical uses of the facility.

Officials of the Naval Ocean Systems Center said that they had done essentially the same functions for prior versions of the combat system. According to Center officials, they had the Navy expertise to do the functions and could perform the functions at less cost than the private contractor. Also, they believed the new site would duplicate the functions of the Center, even though it would not actually duplicate the specific work. However, the Aegis program manager chose to enter into a sole-source contract to establish the test site on the basis that the government did not have the capability to perform the work in-house. The cost of this new site, according to a Navy estimate, is about \$50 million.

CNO and NAVMAT test site reviewing officials said they did not know the site was being purchased because it had not been included in the planning documents submitted for their review. Aegis program officials said they did not consider this site a land-based test site, and they did not follow NAVMAT Instruction 3960.8. However, based on the requirements stated in the instruction, we believe it should have been classified as a land-based test site.

In commenting on our draft report, DOD disagreed that NAVMAT Instruction 3960.8 does not make cost-effectiveness a requisite for establishing a land-based test site. DOD quoted excerpts from the NAVMAT instruction to support its position. However, DOD agreed that cost-effectiveness should be more formally addressed in documentation.

We agree that the NAVMAT instruction infers that cost-effectiveness should be a consideration in establishing a land-based test site. However, CNO and NAVMAT officials told us that they did not interpret the instruction as requiring an actual demonstration of cost-effectiveness but rather as a guideline for program managers in making their site decisions. Therefore, the officials did not require a cost-effectiveness evaluation as part of the review and approval process. We believe that the NAVMAT instruction should provide more definitive guidelines to program managers for determining the cost-effectiveness of alternatives.

DOD stated that our example on the revised antisubmarine warfare combat system was inaccurate in that (1) the contractor site did not duplicate an existing land-based test site, (2) the functions performed at the contractor site were significantly different from those performed at any Navy activity, (3) costs associated with the contractor site were less than \$15 million, (4) the Navy approved the contractor site, and (5) site selection documentation was available in NAVSEA. DOD further stated that the decision to establish the contractor site resulted from an extensive study conducted by NAVSEA in 1982. According to DOD, this study considered many sites and the contractor site was determined to be the only one where the required activities could be accomplished in a cost-effective and timely manner.

The program officials acquire this information in meetings that are usually undocumented. If any documentation is prepared, it is generally discarded after site selection has been made. Only the FFG-7 frigate and Aegis cruiser program offices could provide documentation of the rationales used to select their sites. These documents had been prepared in response to congressional inquiries into the proposed sites and, therefore, contained greater detail than that normally included in planning documents. Furthermore, these documents were prepared more than 10 years ago, before the NAVMAT instruction was issued.

NAVMAT officials told us that they would require better documentation for proposed sites.

In commenting on our draft report, DOD stated that all land-based test sites had approval documentation, but it was not retained. DOD agreed that it would be useful to retain records to document how the need for a site was identified, what alternatives were considered, and why the final alternative was chosen. DOD also stated that, in addition to the personal knowledge or expertise of their staff, program managers used data from past programs, such as site management plans and test reports. DOD further stated that we should recognize the staff offices in the systems commands that oversee, and act as liaisons with, the various test and range facilities.

Because supporting documentation was not retained, we could not verify that program offices used data from prior programs or consulted with systems command staff offices when selecting a land-based test site. We were able to review documents prepared to gain overall approval of a weapons system, such as decision papers and initial test and evaluation plans. These documents seldom mentioned a land-based test site and, when mentioned, it generally was a one sentence statement that a site would be purchased.

COST-EFFECTIVENESS NOT REQUIRED BY NAVMAT INSTRUCTION

The NAVMAT instruction does not make cost-effectiveness a requisite for establishing a new land-based test site. Furthermore, CNO and NAVMAT officials said they do not require that the program manager demonstrate cost-effectiveness before approving a site.

NAVSEA's Aegis program officials, for instance, said that no cost-benefit analyses were performed when they decided to establish a contractor site to integrate and test a revised anti-submarine warfare combat system for the DDG-51 destroyer and the Aegis cruiser. We identified an existing Navy facility--NAVMAF's Naval Ocean Systems Center--that possibly could have performed the necessary program support because it already was integrating and testing other versions of this combat system.

